Appl. No. 09/904,933
Amdt. dated May 27, 2005
Reply to Office action of March 18, 2005

Patent
Docket No. CS-6

Amendments to the Drawings

The attached sheet of drawings (2/8) includes changes to Fig. 3. This sheet, which includes Figure 3, replaces original drawing sheet 2 of 8. In Figure 3, a second input from DAC 71 to mixer 69 has been added.

Attachments: Replacement Sheet

                     Annotated Sheet Showing Changes

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REMARKS/ARGUMENTS

Office Action Summary

Claims 1-10 are pending in the application. The drawings stand objected to because the modulator 69 in Figure 3 lacks a second input. The disclosure stands objected to because "FFT 73" in paragraph [23] should be "IFFT 73. Claims 1-10 stand objected to for various informalities in the language. Claims 1-10 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to comply with the enablement requirement. Claims 4, 7, and 8 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the invention. Claims 9 and 10 stand rejected under 35 U.S.C. § 102(b) as being anticipated European patent number EP 0 991 237 A1 (Huber et al. "Huber"). Claims 1-8 would be allowable if rewritten to overcome the § 112 rejections and other objections noted above. Applicant is unaware of any other rejections or objections pending in the application.

Objection to the Disclosure

Applicant has amended Specification paragraph [23] to correct the phrase "FFT 23" to correctly state "IFFT 23", which is in accordance with the requirements of the Examiner's comments in the objection.

Objection to the Drawings

Applicant has amended the drawings in accordance with the requirements of the Examiner's comments in the objection.

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Claims Objections

Applicant notes, with appreciation, the Examiner's careful review of the claims language. All of the required amendments have been incorporated into Claims 1 through 10.

Rejections under § 112, 1ˢᵗ Paragraph – Enablement

Applicant respectfully traverses the rejection of Claims 1 through 8 on the grounds of lack of enablement. The specification and drawings clearly articulate the illustrative embodiment and the claimed invention with sufficient clarity and detail to enable one of ordinary skill in the art to make and use the claimed invention. All of the claims require the encoding (or decoding) of symbols (or data) as the difference in states between adjacent intervals, and across two different domains (i.e. time and frequency). It is known in the art to encode (or decode) as the difference in states between adjacent intervals of a single domain. For example, between adjacent frequencies in a multi-carrier system, or between adjacent time slots. This is commonly referred to a differential encoding (or decoding). See the Background of the Invention in paragraph [7] and [8]. Since these techniques are known, so to are the hardware structures that are used to accomplish differential encoding in transmitter systems and differential decoding in receiver systems. This explains why the hardware for these functions is presented as functional blocks in Figure 3. Block 75 is a differential encoder and block 74 is a differential decoder. Accordingly also, paragraph [22] describes the hardware used to accomplish these functions as digital signal processors, which are known to those skilled in the art and are nearly universally utilized by designers at the present time.

Also see Figure 6 and Figure 7, which depict prior art differential encoding and decoding schemes operating in the frequency domain and time domain, respectively. That is, each of these prior art embodiments operates by decoding adjacent symbols in

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one domain only. As noted in the Background section, the problem in the prior art is that in an intermitted signal systems, one of the symbols is wasted in terms of data communications. In Figure 6 and Figure 7, one twelfth of the data is wasted. Figure 8, 9, and 10 each clearly depict the advancement in the art taught by the present invention, namely the encoding (and decoding) across dual domains (e.g. time and frequency), that was unknown in the art. In particular, see paragraph [29] of the originally filed Specification, which, *inter alia*, provides:

> [29] Reference is directed to Figure 8, which is an encode/decode matrix diagram 124 that illustrates an embodiment of the present invention.
> ...
> Since it is now appreciated that differential encoding/decoding can occur across time or across frequency, and that it is important to do so with respect to an adjacent carrier state (adjacency measured in either of time or frequency) to control decorrelation, the advancement of the present invention can be appreciated.
> ...
> Rather than resetting to the next row in time, the present invention teaches that a symbol is encoded/decoded between the last carrier state (C_{12},S_1) 138 and the next adjacent carrier state in frequency (C_{12},S_2) 140. By use of this approach, an additional reference only carrier state is not consumed for encoding/decoding without communicating useful information. Encoding/decoding then proceeds across frequency again, sequentially from carrier to carrier at symbol interval S_2 until the end is again reached at (C_1,S_2). The process repeats, encoding/decoding across frequency, then time, then frequency until the last carrier state (C_1,S_{12}) is reached. In this fashion, only a single carrier state 142 is used as a reference only state in the entire matrix.

Similar descriptions exist with respect to Figure 9 and Figure 10. From any of these descriptions, one skilled in the art would appreciate the advancement in the art of duel domain encoding and decoding and would also be enabled to make and use the claim invention. Applicant request that the rejection under § 112 first paragraph be withdrawn.

Rejections under § 112, 2nd Paragraph – Indefiniteness

Applicant respectfully traverses the rejection based on indefiniteness as applied to the amended claims. Applicant notes that the Examiner's comments with respect to the objection to the claims has aided in clarifying the claim language considerably.

With respect to Claim 4, the rejection inquires into what is meant by "sub-carrier states". Those skilled in the art will appreciate that a sub-carrier state has plural dimensions, including time a frequency components. In Claim 4, the differential decoder compares the state of a first and second adjacent sub-carrier at a first symbol interval to decode a first symbol across frequency as the difference in said sub-carriers' states, and compares the state of said first adjacent sub-carrier at a first and second adjacent symbol intervals to decode a second symbol across time as the difference in said sub-carrier states, and operable to output said symbols. These are the dual domains that are differentially decoded by utilization of the teachings of the present invention.

With respect to Claim 7 and Claim 8, which describe the encoding and decoding methods respectively, a similar rationale applies. The sub-carrier states, when decoded differentially across time and frequency, encode information that as to two symbols based on differences in the sub-carrier states. The states include both time and frequency components. Thus, it is Applicant's position that Claims 4, 7 and 8 are not indefinite, but are cleat and enabling to one of ordinary skill in the art, and that the rejection should be withdrawn.

Rejections Under § 102(b) – Anticipated by Huber

Claims 9 and 10 have been canceled, thereby obviating the rejection on view of Huber.

References Cited But Not Relied Upon

Applicant notes the references cited by the Examiner but not relied upon in any of the rejections.

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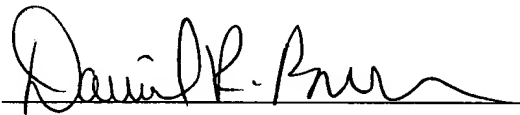
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Conclusion

The foregoing is submitted as a full and complete response to the Office Action mailed March 18, 2005. The Applicant believes that the same places the present application in condition for allowance. Reconsideration by the Examiner and allowance of the claimed invention is hereby courteously solicited.

Since the total number of claims in the Application has been reduced, it is Applicant's belief that all fees in the case have been previously paid. In the event that the Examiner determines otherwise, the that Commissioner is hereby authorized to charge such additional fees, excluding the Issue Fee, or credit any overpayment to Daniel R. Brown Deposit Account No. 501507.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

By: _____

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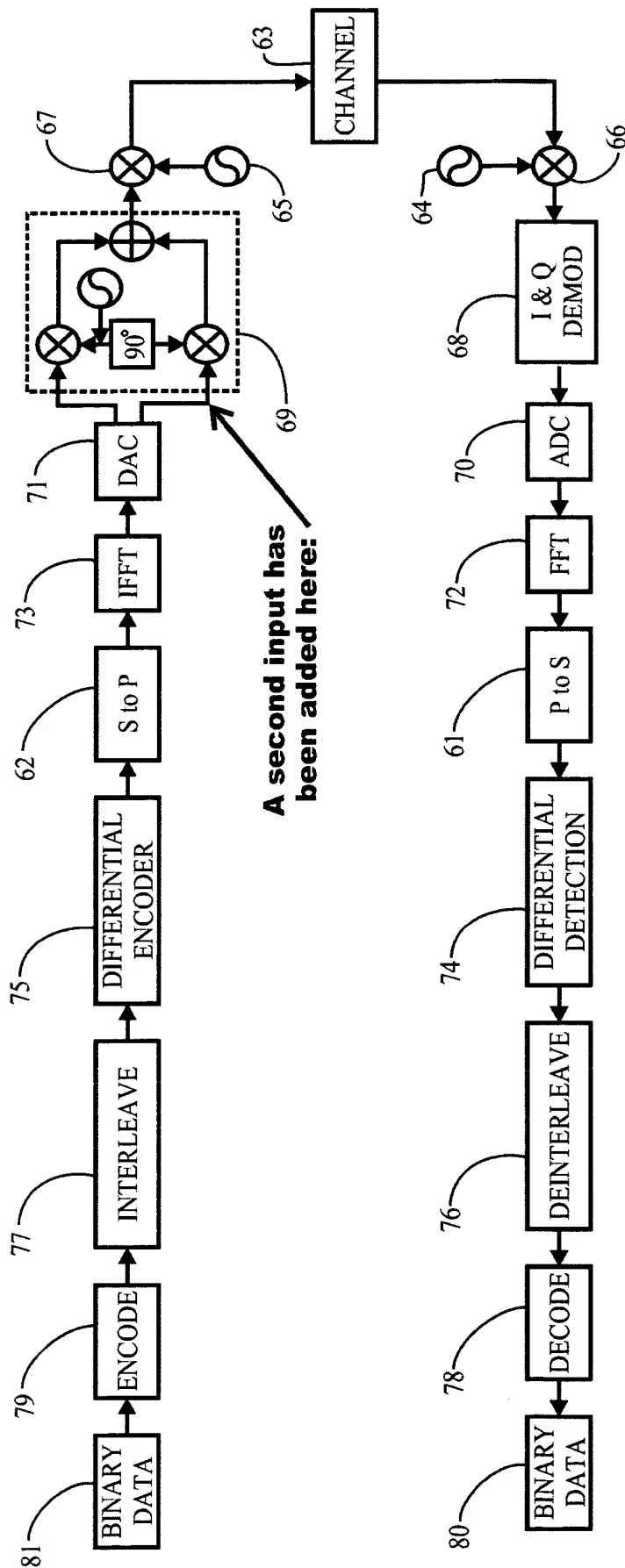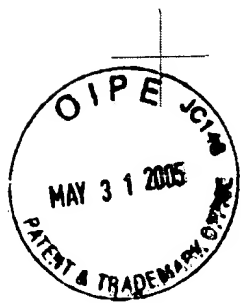Fort Worth, TX 76182

e-mail: dan@danbrownlaw.com

A second input has
been added here:

Fig. 3